



8-2021

Democratizing Educational Innovation and Improvement: The Policy Contexts of Improvement Research in Education

Donald J. Peurach
The University Of Michigan

Anna T. Foster
The University Of Michigan

Angela M. Lyle
The University Of Michigan

Emily R. Seeber
The University Of Michigan

Follow this and additional works at: https://repository.upenn.edu/cpre_workingpapers

 Part of the [Education Commons](#)

Recommended Citation

Peurach, Donald J.; Foster, Anna T.; Lyle, Angela M.; and Seeber, Emily R.. (2021). Democratizing Educational Innovation and Improvement: The Policy Contexts of Improvement Research in Education. *CPRE Working Papers*. Retrieved from https://repository.upenn.edu/cpre_workingpapers/27

This paper is posted at ScholarlyCommons. https://repository.upenn.edu/cpre_workingpapers/27
For more information, please contact repository@pobox.upenn.edu.

Democratizing Educational Innovation and Improvement: The Policy Contexts of Improvement Research in Education

Abstract

The aim of this essay is to advance understandings of current efforts to democratize disciplined approaches to educational innovation and improvement in the US and other countries, with a specific focus on the macro-level policy contexts of improvement research in education. In the US, earlier analyses examined these policy contexts from a contemporary perspective, with an emergent improvement movement in tension with an institutionalized evidence movement. By contrast, this essay provides an historical perspective through a “geological analysis” of US education reform. This analysis has the improvement movement atop macro-level policy contexts that are layers-deep, and as potentially integral to a public education enterprise that has been evolving for centuries: at the policy level, from *resource-forward* to *practice-forward* innovation and improvement; at the local level, from *school systems* to *education systems* to *learning systems*. This analytic approach and framework suggest the need for a new discourse about efforts to democratize disciplined approaches to educational innovation and improvement in the US, as well as possibilities for comparative and international research examining parallel developments in other countries. This essay was prepared as a contribution to *The Foundational Handbook on Improvement Research in Education*.

Keywords

innovation, improvement, policy, research, knowledge production, knowledge use, systems, mass schooling, markets, infrastructure, evidence, practice, resource-forward, practice-forward

Disciplines

Education

Democratizing Educational Innovation and Improvement: The Policy Contexts of Improvement Research in Education

Donald J. Peurach, Anna T. Foster, Angela M. Lyle, Emily R. Seeber

University of Michigan

ABSTRACT

The aim of this essay is to advance understandings of current efforts to democratize disciplined approaches to educational innovation and improvement in the US and other countries, with a specific focus on the macro-level policy contexts of improvement research in education. In the US, earlier analyses examined these policy contexts from a contemporary perspective, with an emergent improvement movement in tension with an institutionalized evidence movement. By contrast, this essay provides an historical perspective through a “geological analysis” of US education reform. This analysis has the improvement movement atop macro-level policy contexts that are layers-deep, and as potentially integral to a public education enterprise that has been evolving for centuries: at the policy level, from *resource-forward* to *practice-forward* innovation and improvement; at the local level, from *school systems* to *education systems* to *learning systems*. This analytic approach and framework suggest the need for a new discourse about efforts to democratize disciplined approaches to educational innovation and improvement in the US, as well as possibilities for comparative and international research examining parallel developments in other countries. This essay was prepared as a contribution to *The Foundational Handbook on Improvement Research in Education*.

Keywords: innovation, improvement, policy, research, knowledge production, knowledge use, systems, mass schooling, markets, infrastructure, evidence, practice, resource-forward, practice-forward

VERSION: AUGUST 2021

Peurach, Donald J.; Foster, Anna T.; Lyle, Angela M.; and Seeber, Emily R. (2021). Democratizing Educational Innovation and Improvement: The Policy Contexts of Improvement Research in Education. CPRE Working Papers. Retrieved from https://repository.upenn.edu/cpre_workingpapers/27/

Democratizing Educational Innovation and Improvement: The Policy Contexts of Improvement Research in Education

Why are efforts to democratize disciplined approaches to educational innovation and improvement just now gaining currency (and not the status quo) in a US public education enterprise fundamentally local since its inception?

In the United States, local education enterprises have long been delegated primary responsibility for innovation and improvement in their core educational functions. Delegating responsibility is one thing. Developing agency and capability broadly and inclusively is quite another, and a much more recent undertaking.

Over the past decade, an improvement movement has coalesced to develop, popularize, and use design-based implementation research, improvement science, community-based design research, and similar approaches to support teachers and school leaders in improving instructional practice; to support schools and districts in organizing, managing, and improving instruction; and to support communities in advancing social justice in-and-through educational improvement. This movement draws in and builds on reflective practice, design research, action research, and other such approaches that, themselves, have been gathering for decades. These approaches are disciplined, in that they aim to introduce structure, method, and rigor to local invention, development, and problem solving. They are being advanced within and across local educational enterprises, in networks and through partnerships, in the US and around the world.

We conceptualize this family of approaches as “improvement research in education” (Peurach et al., forthcoming). This is research that is:

- Grounded in practice and community contexts.
- Focused on aspirations, needs, and problems in educational practice and communities.
- Characterized by the production and use of practical knowledge through formal, iterative methods of inquiry, theorizing, design, implementation, and evaluation.
- Advanced using novel organizational forms in which researchers, educational professionals, community members, and/or other stakeholders collaborate to understand and improve classrooms, schools, systems, and other learning contexts.

Improvement research has become a keen focus of scholars examining local educational enterprises, both at the micro-level (classrooms and schools) and the meso-level (districts, communities, networks, and partnerships). Our purpose is to extend this scholarship by examining the macro-level policy contexts of improvement research in K-12 US public education. Our aim is to develop an analytic approach and framework useful for examining the advancement of improvement research in the US and in other countries.¹

We conceptualize “macro-level policy contexts” broadly as interests, initiatives, and movements at the national, federal, and state levels that aim to drive the agenda for (and pursuit of) innovation and improvement at the micro- and meso-levels, in local education enterprises. In the US, these macro-level policy contexts are, by design, sprawling, fragmented, and contentious, often lacking in coherence, rife with turbulence, and analytically intractable. Initiatives and movements can be advanced by branches

This geological analysis goes beyond policy dynamics that position an institutionalized and strengthening evidence movement in tension with an emergent and potentially complementary improvement movement. Rather, it has macro-level policy contexts as layers-deep, each developing in ways that support and pressure others. This emergent improvement movement sits on the surface, potentially integral to a public education enterprise that has been evolving for centuries and foundational to its continuing evolution.

and agencies of government; they can be advanced by philanthropies, non-profit and for-profit organizations, research centers, and interest groups. They can gain formal authority through laws, regulations, court cases, and standards; they can gain informal authority through social legitimacy, cultural embrace, power-of-idea, and evidence of effectiveness.²

Our earlier research takes a contemporary perspective, one line of argument being that improvement research, while possibly complementary, is developing in tension with an institutionalized and strengthening policy focus on scientific research evidence as a lever on educational improvement.³ While this line of argument provides strong purchase on contemporary challenges to advancing improvement research at all levels, it provides weak purchase on the question that motivated this analysis: *Why are efforts to democratize disciplined approaches to educational innovation and improvement just now gaining currency (and not the status quo) in a US public education enterprise fundamentally local since its inception?*

That question can only be answered by taking an historical perspective on macro-level policy contexts to understand the institutionalization of a status quo approach to innovation and improvement and the development of improvement research in relation to it.

With this essay, we complement our earlier research by developing an historical perspective on the macro-level policy contexts of improvement research in education. Figuratively speaking, we engage in a “geological analysis” by drilling down to the bedrock of US public education and extracting a core sample that we then scrutinize layer-by-layer.⁴ In this core sample, we identify two strata of educational innovation and improvement advanced in macro-level policy contexts, each with a different primary driver in the first position and with sub-strata providing further structure. These strata and sub-strata have the curious property of being active (not sedimentary), such that history is alive in the moment.

We call the deeper strata the *resource-forward* approach for its emphasis on educational resources as the primary driver of innovation and improvement. Its structure derives from the co-evolution of *mass public schooling* in the US, an *educational resource market* that supports instruction and its improvement en masse, and a federally supported *evidence infrastructure* that supports the production and dissemination of research evidence.

We call the more nascent strata the *practice-forward* approach for its emphasis on instructional practice and its contexts as primary drivers of innovation and improvement. Its structure derives from the emergence of a *transparency movement* providing insight into educational processes and outcomes; an *excellence and equity* movement aimed at improving instruction, its organization, and its management; and an *improvement movement* supporting the local production and use of practical knowledge.

This geological analysis goes beyond policy dynamics that position an institutionalized and strengthening evidence movement in tension with an emergent and potentially complementary improvement movement. Rather, it has macro-level policy contexts as layers-deep, each developing in ways that support and pressure others. This emergent improvement movement sits on the surface, potentially integral to a public education enterprise that has been evolving for centuries and foundational to its continuing evolution.

An elaboration of this geological analysis would provide a new perspective on the macro-level policy contexts of improvement research in education and, with that, new purchase on efforts to democratize educational innovation and improvement in the US and in other countries. So that is how we proceed: first, by explicating the resource-forward approach and, then, the practice-forward approach. We conclude by reflecting on our motivating question and on potential directions for further comparative and international research.

■ Resource-Forward Innovation and Improvement

We begin with the deeper strata of educational innovation and improvement, the resource-forward approach, and with its three sub-strata: mass public schooling, an educational resource market, and federally supported evidence infrastructure. The underlying theory of action is that educational opportunities, experiences, and outcomes can be improved (and disparities reduced) by the production of more and better educational resources distributed more equitably among local education enterprises. The resource-forward approach is the status quo and still developing, as macro-level policy contexts continue strengthening to support the resource-forward approach.

Mass Public Schooling

US public education emerged and evolved, first and foremost, as a mass public schooling enterprise that afforded access to instruction to more (and more diverse) students and that, consequently, created the need and demand for more and better educational resources (Peurach, Cohen, Yurkofsky, et al., 2019). This owes much to macro-level policy contexts that coalesced to advance ambitions for equal access to public schooling while continuing to debate the meaning and methods of educational quality and equity.

Again, we start by drilling down to the bedrock of US public education, commonly recognized as a series of three laws issued by the General Court of the Massachusetts Bay Colony in the 1640s associating literacy instruction with religious and civic engagement. Under threat of fine and oversight of local selectman, these laws established educational responsibilities for families and households; requirements for towns with 50 or more families to hire a schoolmaster to teach all dependent children (natural born, apprentices, and servants) to read and write; and towns with 100 or more families to establish grammar schools to prepare students for entry to Harvard College. These laws marked the first efforts to locate responsibility for children's education in the public sphere, under the press of a central government authority and as the province of self-governing communities, with the aim of broadening educational access and quality beyond that customarily provided by their families, households, and churches.

US public education has been forming and reforming for the nearly 400 years since, owing to the further association of public education with individual liberty, social equality, functional democracy, economic advancement, and national defense. From its inception to the present, the macro-level policy agenda has largely centered on three fundamental priorities. The first is the press to increase *access* to public education: getting more children into schools and classrooms. The second is the press to increase *quality* in public education: improving learning opportunities, experiences, and outcomes for students once in schools. The third is the press to increase *equity* — fairness and justice — in and through public education.

For example, in the colonial era, visions and ambitions for increasing educational access, quality, and equity drove debate about the essential role of public education in democratic society (Cremin, 1970). In the mid-1800s, they were integral to the Common Schools Movement (the first coordinated, cross-state reform movement), which sought to expand access for boys and girls in urban and rural communities, to

US public education emerged and evolved, first and foremost, as a mass public schooling enterprise that afforded access to instruction to more (and more diverse) students and that, consequently, created the need and demand for more and better educational resources (Peurach, Cohen, Yurkofsky, et al., 2019). This owes much to macro-level policy contexts that coalesced to advance ambitions for equal access to public schooling while continuing to debate the meaning and methods of educational quality and equity.

establish normal schools to improve teacher quality, and to improve curricula to prepare students more fully for citizenship (Kaestle, 1983). Through the late 1800s and into the early 1900s, they were integral both to compulsory attendance laws that drove more (and more diverse) students into public schools amidst mass immigration, urbanization, and westward expansion and to a progressive education movement that pressed for critical, socially engaged, egalitarian public education respectful of increasing student diversity (Tyack & Hansot, 1982).

Yet the advancement of educational access, quality, and equity faced contradictions at every turn. From the colonial era into the mid-1800s, funding disparities, racism, xenophobia, and poverty sustained inequities in access and quality among communities in the North, and slavery denied Black children access to public education in the South (Moss, 2009). In the late 1800s, emancipation drove the onset of Jim Crow and de jure segregation of students by race in the South (Anderson, 1988); migration and immigration exacerbated de facto segregation of students by race, ethnicity, and social class in the North; and the US Supreme Court affirmed “separate but equal” as the law of

the land (*Plessy v. Ferguson*, 1896). In the early 20th century, the federal Smith-Hughes Act of 1917 (the first federal K-12 education policy) supported the advent of home economics and vocational education and, with that, opportunity to segregate students further within schools by gender, race, social class, and perceived ability.

Following World War II and through the baby boom, the national focus shifted toward a coherent, sustained press to address a most fundamental educational challenge: ensuring equal access to public education for all children, especially those historically discriminated against based on race, ethnicity, gender, disability, social class, or religion. This press was coherent, in that it featured the shared pursuit of a common aim. It was sustained, in that it lasted for decades.

The press for equal access was advanced through social and political movements: for example, the civil rights movement, the women’s rights movement, the disability rights movement, and the war on poverty. It was advanced through federal court decisions that prohibited segregation in public education based on national origin, race, and language proficiency: for example, *Méndez v. Westminster School District of Orange County* (1947); *Brown v. Board of Education of Topeka* (1954); and *Lau v. Nichols* (1974). And it was advanced through federal policies that prohibited discrimination based on race, color, national origin, sex, or disability: for example, Title VI of the Civil Rights Act of 1964; Title IX of the Education Amendments of 1972; Section 504 of the Rehabilitation Act of 1973; and the Education for All Handicapped Children Act of 1975.

As macro-level policy contexts coalesced to press for equal access, the meaning and methods of advancing quality and equity remained matters of debate and disagreement. Through the 1950s and 1960s, public discourse, intellectual movements, and political turbulence elevated aspirations for quality and equity: for example, the publication of *Why Johnny Can’t Read* (Flesch, 1955), the onset of the cognitive revolution, and the Soviet launch of Sputnik. Yet the 1970s and early 1980s followed with a back-to-basics movement that argued down the terms of quality and equity and with the US Supreme Court ensuring handicapped students only a “basic floor of educational opportunity” (*Board of Education v. Rowley*, 1982). Throughout, responsibility for defining and pursuing educational quality and equity

As macro-level policy contexts coalesced to advance ambitions for equal access to public schooling, and as need and demand for more and better educational resources grew, the educational resource market became a primary mechanism for advancing educational quality and equity at the local level amidst debate and disagreement on their meaning and methods in macro-level policy contexts.

continued to be delegated to local education enterprises.

The press for equal access yielded considerable progress. In 1972, the US District Court of the District of Columbia affirmed equal access to public education for all children, including handicapped children (*Mills v. Board of Education*, 1972). In 1982, the US Supreme Court extended access further to include undocumented immigrant children (*Plyler v. Doe*, 1982). Indeed, the return on these efforts and those that preceded them was the creation of formidable state and federal policy, legal, and financial infrastructures ensuring what is tantamount to universal access to mass public schooling.

Even so, court decisions, policies, and issues have kept the pursuit of equal access squarely on the macro-level policy agenda. These include US Supreme Court decisions upholding de facto segregation in public education, beginning with *Milliken vs. Bradley* (1974) and continuing through *Parents Involved in Community Schools vs Seattle School District No. 1* (2017); racially motivated opposition to state efforts to centralize funding to support equal access and educational

adequacy (Reed, 2003); and policy responses to disproportionate disciplinary actions, absenteeism, and dropouts among students of color.

The Educational Resource Market

As US public education evolved as a mass schooling enterprise, it did so in interaction with an emerging-and-evolving educational resource market that supported the exchange among non-governmental organizations (on the supply side) and districts and schools (on the demand side) of the component materials, methods, people, and services needed to constitute, enact, and improve classroom instruction en masse (Peurach, Cohen, & Spillane, 2019). As macro-level policy contexts coalesced to advance ambitions for equal access to public schooling, and as need and demand for more and better educational resources grew, the educational resource market became a primary mechanism for advancing educational quality and equity at the local level amidst debate and disagreement on their meaning and methods in macro-level policy contexts.

The dependence on non-governmental organizations for educational resources dates to the early spread of public education and the rise of commercially published textbooks. Early examples include the *New England Primer*, a textbook for reading and religious instruction first published in 1690; *A Grammatical Institute of the English Language*, a three-volume speller, grammar, and reader first published in 1783; *McGuffey Readers*, a series of leveled reading textbooks first published in 1836; and *Ray's Arithmetic*, a series of mathematics textbooks first published in 1834. By the 1820s, more than 70 textbooks were in widespread use, with those cited above numbering in the millions by the end of the century (Cubberly, 1929; Elson, 1964; Johnson, 1904).

The early dependence on commercial publishers was an artifact of rebellion against monarchy and mercantilism, distrust of central government authority over local and individual concerns, and faith in entrepreneurship and free markets as drivers of social progress. It was an artifact of public schooling emerging in advance of an organized teaching profession with authority over the resources and methods of instruction. And it was responsive to local authority over substantive educational matters, local choice in the selection of educational resources, and public confidence that those educational resources would

Following World War II and into the 1980s, the federal government, state governments, and philanthropies began engaging the educational resource market as a mechanism for advancing educational quality and equity. Again, this was a period in which a coherent, sustained press for equal access yielded formidable state and federal policy, legal, and financial infrastructures ensuring that all students could attend public school. This period did not, however, yield commensurate, macro-level educational infrastructure to ensure quality and equity in students' education once in schools

be put to effective use.

The dependence on non-governmental organizations grew into the mid-1800s, with the rise of state-supported normal schools and, later, federally supported land grant colleges and universities as suppliers of the primary social resource for instruction: teachers. It grew further with the rise of non-governmental organizations and associations that provided materials, knowledge, and services aimed at improving educational quality: for example, the National Education Association (est. in 1870); regional membership organizations responsible for the accreditation of colleges and schools (originally chartered in the 1880s); the American Psychological Association (est. in 1892); the College Entrance Examination Board (est. in 1899); the National Council of Teachers of English (est. in 1911); the American Educational Research Association (est. in 1916); and the National Council of Teachers of Mathematics (est. in 1920).

Following World War II and into the 1980s, the federal government, state governments, and philanthropies began

engaging the educational resource market as a mechanism for advancing educational quality and equity. Again, this was a period in which a coherent, sustained press for equal access yielded formidable state and federal policy, legal, and financial infrastructures ensuring that all students could attend public school. This period did not, however, yield commensurate, macro-level *educational* infrastructure to ensure quality and equity in students' education once in schools: for example, social and political consensus on the means and ends of instruction, along with coordinated instructional models, curricula, materials, assessments, and teacher development for pursuing those means and ends (Cohen et al., 2014; Peurach, Cohen, Yurkofsky, et al., 2019). Again, responsibility for building, leveraging, and improving educational infrastructure rested where it had from the beginning: with local education enterprises.

Indeed, over this period, the federal and state governments were slow to engage the *educational* work of public education – classroom instruction – with detailed guidance for practice, much coherence, or much accountability beyond administrative compliance (Cohen & Spillane, 1993; Fuhrman, 1993; Smith & O'Day, 1990). This owed to reasons sketched above: the tradition of local educational authority and confidence in local capabilities; a national culture deeply distrustful of central authority; the designed fragmentation of governance; the lack of federal constitutional authority over education; the evolution of state departments of education as administrative agencies with weak capabilities to support instruction; and short election cycles, rapid issue-attention cycles, and turbulent policy agendas at all levels.

Instead, the federal government, state governments, and philanthropies began fueling and directing the educational resource market to produce and distribute the resources needed to support instruction for the more (and more diverse) students accessing public schools. Rather than developing local capabilities for disciplined methods of analysis, problem solving, and design, districts and schools were to mine the market to acquire educational resources to address local educational ambitions and priorities.

On the demand side, growth was driven by state efforts to equalize funding among districts, increased philanthropic engagement, and, especially, federal block grants, formula grants, and categorical grants to states, districts, and schools that provided supplemental and discretionary funding aimed at advancing educational quality and equity. Three policies supporting educationally disadvantaged students, special

education students, and vocational education students formed the backbone of federal funding – policies subsequently institutionalized through multiple reauthorizations:

- The Elementary and Secondary Education Act of 1965 (most recently reauthorized as the Every Student Succeeds Act of 2015).
- The Education for All Handicapped Children Act of 1975 and the Individuals with Disabilities Education Act of 1990 (most recently reauthorized in 2004 and amended through the Every Student Succeeds Act of 2015).
- The Vocational Education Act of 1963 and, later, the Carl D. Perkins Career and Technical Education Act of 1984 (most recently reauthorized in 2018).

On the supply side, growth was driven by competitive federal and philanthropic grants and contracts to non-governmental and quasi-governmental organizations to develop resources supporting instruction and instructional improvement in local education enterprises. These grants and contracts prioritized ever-shifting macro-level policy ambitions for quality and equity and, with that, opened and closed niches supporting entrepreneurship and innovation (Cohen & Mehta, 2017; Rowan, 2002; Thümmler, 2014). Aside from securing operating capital, the educational resource market had few barriers to entry and little government oversight.

By the 1990s, the educational resource market had evolved to support a multi-billion dollar “school improvement industry” that included for-profit firms (e.g. publishers, vendors, and service providers), membership organizations (e.g. professional associations, accrediting bodies, and advocacy groups), and non-profit organizations (e.g. university-based projects, granted-funded program and service providers, and research enterprises), all providing materials, knowledge, and services supporting instruction and instructional improvement (Rowan, 2002). At the time of this writing, one market analysis valued the preK-12 instructional materials market alone at \$8.9 billion (Simba Information, 2021). Another valued the K-12 digital curriculum market alone at \$15.1 billion (Cauthen, 2021).

Evidence Infrastructure

Following World War II, as the federal government, state governments, and philanthropies began investing in the educational resource market to advance quality and equity, the federal government also began directing and fueling this market in another way: through the development of a federally supported evidence infrastructure to structure the production and use of research evidence (Peurach, 2016; Peurach et al., 2018).⁵ With that, capabilities for disciplined approaches to producing and using scientific knowledge evolved in macro-level policy contexts, de-contextualized from specific classrooms, schools, and districts.

This federally supported evidence infrastructure includes a vast, diverse array of governmental, quasi-governmental, and non-governmental organizations that engage in what Lindblom and Cohen (1979) call “professional social inquiry”: the production of research evidence to inform agenda-setting and decision-making in macro-level policy contexts, the production of educational resources, and decisions and work in districts and schools.

The architecture of the evidence infrastructure began forming in 1867, with the establishment of the first US Department of Education. Following the Civil War, amidst debate and concern about federal engagement in public education, the role of the Department was limited to collecting and publicizing descriptive statistics on growth, access, attendance, and investment in public education (Morgan, 2021).

Following World War II, as the federal government, state governments, and philanthropies began investing in the educational resource market to advance quality and equity, the federal government also began directing and fueling this market in another way: through the development of a federally supported evidence infrastructure to structure the production and use of research evidence (Peurach, 2016; Peurach et al., 2018). With that, capabilities for disciplined approaches to producing and using scientific knowledge evolved in macro-level policy contexts, de-contextualized from specific classrooms, schools, and districts.

In 1869, continued debate and concern led to its reorganization as the Office of Education within the US Department of the Interior. The Office of Education was later moved to the Federal Security Agency; moved still later, in 1953, to the newly created US Department of Health, Education, and Welfare; and dissolved in 1972 with the establishment of the Office of Educational Research and Innovation.

The architecture took further form following the publication of *Science: The Endless Frontier* (Bush, 1945), a seminal report from the director of the federal Office of Scientific Research and Development at the request of the president. Published at the end of World War II and anticipating the Cold War, the report argued that new knowledge was needed to ensure national health, prosperity, and security, and that “this essential new knowledge can be obtained only through basic scientific research” (p. 1). The report led to the establishment of the National Science Foundation in 1950, which, in 1954, began sponsoring basic and applied research in STEM education. The National Institutes of Health would soon follow with support for basic and applied research in science education.

The architecture took its present form in the 1960s and 1970s, amidst the coherent, sustained press for equal access and amidst increasing federal engagement with the educational resource market. This included the establishment of:

- The National Center on Educational Statistics as the successor of the Office of Education, charged with reporting on progress and problems in public education (est. in 1972).
- The National Institute of Education as a federal grant-making body charged with advancing basic and applied research in education, modeled after the National Institutes for Health (est. in 1972).
- Independent, federally funded research centers and regional laboratories, the former charged with basic research and the latter with applied research and development (est. in 1965, under Title III of Elementary and Secondary Education Act).
- An ecosystem of university-based projects and centers, non-profit firms, and for-profit firms with additional capabilities for basic research, applied research, and program evaluation, themselves organized in associations and industry groups.
- The Educational Resources Information Center Clearinghouse (est. in 1964) and the National Diffusion Network (est. in 1974), both charged with widespread communication and transfer of research and programs.

Thus framed, the distribution of functional responsibilities within this federally supported evidence infrastructure mirrored (and was legitimized by) a culturally understood logic widely used across sectors to frame the production and use of knowledge for instrumental purposes: a sequential process of research, development, dissemination, and utilization (Peurach et al., 2016). By this “RDDU” logic, basic and applied research feed the development, piloting, and packaging of novel resources. These resources are widely diffused and distributed, and, then, acquired and adopted among large numbers of users – in

effect, transferring scientific knowledge into practice.

As an organizing logic, the RDDU sequence dates to the beginning of the 20th century, with the decades-long, stepwise emergence of “basic research”, “applied research”, “development”, and “diffusion” as statistical and reporting categories used by scientists, government agencies, industrialists, and economists to analyze relationships among science, technology, the economy, and society within and between countries (Godin, 2006). The categories thus carry values that animate those groups, including the primacy of basic scientific research as the driver of innovation; order and rationality in rendering complex activity; and efficiency, economies of scale, and returns on investment as measures of success. These categories were subsequently used in seminal research conceptualizing the innovation process in agriculture and, then, generally, across sectors (Rogers, 2003). As argued by Godin (2006:660), “having become entrenched in discourses and policies with the help of statistics and methodological rules, the (linear innovation) model became a social fact”.

The federally supported evidence infrastructure continues to evolve, with its foundational architecture intact and with a new, concerted focus on the development of evidence-based and evidence-proven educational resources (Peurach, 2016; Peurach et al., 2018). Central to this evolution was the Education Sciences Reform Act of 2002, which reorganized the federal Office of Educational Research and Improvement as the Institute for Education Sciences and the Office of Innovation and Improvement (subsequently incorporated into the Office of Elementary and Secondary Education). The evolution was also driven by a broader emphasis on evidence-based social policy in the 2010s under the Obama administration (Haskins & Baron, 2011).

Together, the Institute for Education Sciences and the Office of Innovation and Improvement have led efforts to advance research methods, quality, standards, and training; to sustain the national research centers and regional labs; to structure grant programs using a five-stage goal structure and a “tiered evidence sequence” that heed the RDDU logic; and to develop the What Works Clearinghouse to vet and publicize evaluations of effectiveness. The evolution has also included new criteria in federal grants to states and local education enterprises prioritizing the selection of evidence-based and evidence-proven educational resources; the use of research evidence as a resource for local decision making; and the use of evidence-based “best practices” as resources for instructional improvement. Continued federal investment, in turn, has further directed and fueled the supporting ecosystem of university-based projects and centers, non-profit and for-profit firms, and membership-based associations and industry groups.

The Deep Structure of the Resource-Forward Approach

By this geological analysis, the resource-forward approach has emerged, developed, and evolved over centuries as a foundational stratum of educational innovation and improvement aiming to advance educational access, quality, and equity. Three sub-strata — mass public schooling, the educational resource market, and federally supported evidence infrastructure — function as a deep structure that motivates, orders, and supports the production and exchange of educational resources, predicated on public confidence in (and the assumption of) local capabilities to coordinate and to use these resources effectively to advance quality and equity.

This deep structure is institutionalized along fundamental dimensions detailed by Tyack and Tobin (1994) and Tyack and Cuban (1995). It is functional, in that it affords efficiencies and economies of scale in supplying the educational resources needed to provide instruction for more (and more diverse) students, in ways that balance macro-level and local-level priorities for educational quality and equity. It is cultural,

in that it heeds public confidence in local education enterprises, distrust of central government, trust in markets, and understandings of research and innovation. It is political, with organizations, associations, and interests vested in the resource-forward approach interacting to establish and sustain themselves and their influence.

Though institutionalized, this deep structure is still actively developing. Even so, by the logic of Tyack, Tobin, and Cuban, and despite the charged rhetoric of many educational reformers and critics, it is more likely to favor tinkering over transformation: sustained, incremental, evolutionary improvement rather than immediate, radical, disruptive reconstruction.

Practice-Forward Innovation and Improvement

We continue with the more nascent strata of educational innovation and improvement, the practice-forward approach, and with its three sub-strata: the transparency movement, the excellence and equity movement, and the improvement movement. Rather than more and better educational resources as the first-position drivers, the underlying theory of action is that educational opportunities, experiences, and outcomes can be improved (and disparities reduced) by improving instructional practice and the contexts in which it is situated. The practice-forward approach evolved out of the resource-forward approach, is developing in interaction with it, and functions as a complement (not an alternative).

The Transparency Movement

The roots of the transparency movement (and, with that, the practice-forward approach) lie in the Janus-like character of the federally supported evidence infrastructure. A central ambition for this evidence infrastructure was to elevate the role, legitimacy, and rigor of research evidence in advancing educational quality and equity. That, in turn, had the additional effect of making the work and outcomes of US public education more transparent, more visible, and more open to observation, scrutiny, and critique than had been the case.

Until the evidence infrastructure began taking firm form in the 1960s, social and political support for public education was anchored more in public confidence in local competence, creativity, and inventiveness than in rich evidence of how local education enterprises worked, what they produced, and for whom (Meyer & Rowan, 1978). Confidence of this sort had long been integral to a national “can do” culture and to public education: Yankee ingenuity, that pioneering spirit, and jazz improvisation as manifest in local control and professional autonomy. Local education enterprises, in turn, were enabled by macro-level policy contexts that sought to seed creativity and inventiveness through the spread of more and better educational resources.

Yet as this evidence infrastructure began to function and as findings and theories began to accumulate, several lines of research began to suggest a paradox: An exclusive focus on educational resources risks undermining (rather than advancing) ambitions for educational quality and equity, absent commensurate attention to instructional practice and its contexts.

For example, research examining the influence of educational inputs on educational outputs raised questions about the fundamental premise of the resource-forward approach: the assumption of a direct, positive relationship between resources and educational outcomes. These questions emerged as a product of the federally supported evidence infrastructure, with what became known as the Coleman

As this evidence infrastructure began to function and as findings and theories began to accumulate, several lines of research began to suggest a paradox: An exclusive focus on educational resources risks undermining (rather than advancing) ambitions for educational quality and equity, absent commensurate attention to instructional practice and its contexts

Report: a study mandated by the federal Civil Rights Act of 1964, commissioned by the federal Office of Education, and conducted by the federally funded Center for the Social Organization of Schools at Johns Hopkins University (Coleman et al., 1966). Among other things, the report evidenced a formidable achievement gap between white and Black students, arguing that this gap was explained more by differences in family background than by differences among schools in financial and educational resources.

Since then, researchers have continued to challenge and extend these findings (Borman & Dowling, 2010; Greenwald et al., 1996; Hanushek, 1989; Jencks et al., 1972; Reardon, 2016). One line of argument that emerged is that what matters for advancing quality and equity are not differences in the distribution of educational

resources but, instead, differences in capabilities in districts and schools to use those resources to design, organize, manage, and enact high quality educational opportunities for students (Bryk & Raudenbush, 1988; Cohen et al., 2003; Duncan & Murnane, 2014; Rowan et al., 2009). Consequently, providing more-and-better resources without also addressing differences in capabilities for their use risks a Matthew effect: More capable districts and schools get better; less capable districts and schools do not.

Other research examining dynamics among educational environments, district and school organization, and instruction raised questions about the presumably positive effect of markets on instructional practice. These markets had long been dominated by deeply institutionalized and conservative commercial textbook publishers and university-based teacher education programs. Despite federal and philanthropic investment aimed at fostering innovation, researchers reported that short-term instability in policy agendas and funding priorities, the lack of consensus on desired educational outcomes, and the lack of accountability for results interacted to favor faddism over substance in the educational resource market (Meyer & Rowan, 1978; Rowan, 2002; Slavin, 1999).

- On the supply side, developers faced strong incentives to heed turbulent policy agendas and funding priorities; weak incentives to provide strong guidance and support for the use of resources in practice; and difficulty sustaining themselves between grant cycles.
- On the demand side, local education enterprises faced strong incentives to adopt novel resources to maintain legitimacy and confidence among constituents; few incentives to incorporate them into coherent, local-level educational infrastructure; and weak incentives and accountability for putting them to instrumental use.

These market dynamics reinforced a pattern of instructional organization and management that preserved (rather than disrupted) established inequities and practices (Meyer & Rowan, 1978; Peurach, Cohen, Yurkofsky et al., 2019). Under the press of equal access, districts and schools sorted more (and more diverse) students into academic tracks, “regular” classrooms, and compensatory instructional venues. Under a press for innovation, leaders resourced those venues with conservative teachers and textbooks and with uncoordinated, faddish materials and programs. Isolated in classrooms, teachers were delegated responsibility for organizing and managing instruction for the students assigned to them using the resources provided, absent guidance from resource providers, support from colleagues, or oversight from leaders otherwise occupied with political and administrative responsibilities. Teachers leaned most heavily on familiar, conservative textbooks, refashioned novel resources to support established practices, or ignored them entirely in favor of self-designed resources (Lortie, 1975; Cohen, 1990).

Still other research examining the work of large-scale educational innovation and improvement began questioning assumptions underlying the RDDU logic that structured and legitimized the federally supported evidence infrastructure. For example, researchers both argued and found that:

- Basic and applied educational research are not ready foundations for resource development but, instead, often weak, contested, and inattentive to practical use (Kaestle, 1993).
- Development is work not limited to educational laboratories but, instead, work that also plays out collaboratively in practice contexts (Bryk, 2009).
- Dissemination is not the straightforward transfer of knowledge, resources, and programs but, instead, a complex process of mutual adaptation and co-construction among developers and educational professionals (Berman & McLaughlin, 1975; Datnow & Park, 2009).
- Utilization at scale is not best conceptualized in terms of adoptions and efficiencies but as a process of institutionalizing novel practices in new contexts (Coburn, 2003).

Further, researchers found that the work of research, development, dissemination, and utilization do not play out in sequence but, instead, simultaneously and interdependently, as resource providers collaborate with local education enterprises to manage endemic complexity and uncertainty (Berends et al., 2002; Glennan et al., 2004; Peurach, 2011). Moreover, these interactions heeded an alternative “evolutionary logic” through which new knowledge is produced, used, and refined not only *in advance* of large-scale innovation and improvement but, also, via iterative, collaborative inter-organizational learning *in the context* of large-scale innovation and improvement (Penuel et al., 2021; Peurach et al., 2016).

On the one hand, managing the work of large-scale educational innovation and improvement in these ways has potential to mitigate a Matthew effect by engaging educational professionals as active collaborators in new types of *epistemic communities* that share responsibility for producing and using practical knowledge (Glazer & Peurach, 2015). On the other, realizing that potential would require developing capabilities for new forms of collaboration among local education enterprises deeply habituated to knowledge transfer-and-absorption (and not local knowledge co-construction) and researchers habituated and incentivized to use scientific research methods to advance general knowledge.

The Excellence and Equity Movement

Thus, from its inception, the transparency movement began yielding a growing body of research suggesting that exclusive dependence on the the resource-forward approach is not sufficient for advancing educational quality and equity en masse (and often counter-productive); that advancing quality and equity would also depend on deeper, more coherent, and more sustained engagement with practice and practice contexts than had been customary; and that such engagement would benefit from complementary support for producing and using practical knowledge in local contexts.

This research continued to accumulate in interaction with shifts in macro-level policy contexts in precisely these directions beginning in the 1980s, as progress toward equal access gave way to a movement to advance educational excellence and equity (Peurach, Cohen, Yurkofsky et al., 2019; Ravitch, 1990). This shift owed much to the re-establishment of the US Department of Education as a cabinet-level agency, in recognition by Congress of the “continuing need to ensure equal access for all Americans to educational opportunities of a high quality, and such educational opportunities should not be denied

The macro-level policy focus on excellence and equity took still-deeper roots in the 1990s and has continued for the 30 years since. Myriad governmental and non-governmental initiatives, movements, and policies have sought not only to improve the quality and distribution of educational resources but, also, to effect fundamental change in the organization, management, and improvement of classroom instruction.

because of race, creed, color, national origin, or sex” (Department of Education Organization Act of 1979).

Initial actions by the Department of Education further fueled the transparency movement in ways that began shifting the policy agenda toward excellence and equity. In 1981, the Department established the National Commission on Excellence in Education, with its 1983 report, *A Nation at Risk*, associating low quality and inequities in education with issues of national defense, global economic standing, and social inequality. In 1984, the Department published *State Education Statistics*, “the first document ever to compare states on the basis of their public schools’ educational performance and to relate performance to each state’s educational resources and population characteristics” (Ginsburg et al., 1988:1). That was followed by the reform of the National Assessment of Educational Progress (first administered in 1969) to further evidence differences in performance among states (Alexander, 1987).

These initial actions sparked national debate about alternative policy approaches to advancing excellence and equity, including increasing local accountability for outcomes (National Governors Association, 1986); elevating the professional status, preparation, and quality of teachers (Carnegie Forum on Education and the Economy, 1986); and introducing markets supporting school choice (Chubb & Moe, 1988). They fostered new dynamics among the federal and state governments, culminating in 1989 with consensus on six National Education Goals promoting excellence and equity (Vinovskis, 1999). And they motivated seminal designs for coherent, systemic reform in macro-level policy contexts, districts, schools, and classrooms (Smith & O’Day, 1990).

The macro-level policy focus on excellence and equity took still-deeper roots in the 1990s and has continued for the 30 years since. Myriad governmental and non-governmental initiatives, movements, and policies have sought not only to improve the quality and distribution of educational resources but, also, to effect fundamental change in the organization, management, and improvement of classroom instruction.

This focus has been pressed through a strengthening transparency movement generating and publicizing evidence of educational quality and disparities among students, schools, districts, states, and countries. It has been pressed through new policy discourse calling for *ambitious instruction* supporting *deeper learning* and the development of *21st century skills for all students*, and for *restructuring* districts and schools to build *capacity* and *coherence* to *scale* and *sustain* improvement. It has been pressed through court decisions affirming the rights of handicapped students to appropriately ambitious and challenging educational opportunities. It has been pressed through policies supporting new approaches to organization and governance (e.g., portfolio districts, turnaround districts, and charter school networks) and new categories of instructional guidance (e.g., standards, assessments, and evaluations as advanced by states, consortia, and professional associations). And it has been pressed through a litany of federal policy initiatives, including backbone anchors of the educational resource market:

- The Improving America’s Schools Act of 1994.
- The Goals 2000 – Educate America Act of 1994.
- The Obey-Porter Comprehensive School Reform Demonstration Act of 1998.
- The Reading Excellence Act of 1999.
- The No Child Left Behind Act of 2001.

- The Race to the Top challenge of 2009.
- The Every Student Succeeds Act of 2015

While lacking the coherence sought by some reformers, these initiatives, movements, and policies have been structured by a core set of policy logics that have roots in the debates of the 1980s and that maintain currency (Peurach, Cohen, Yurkofsky et al., 2019). While these logics differ in their underlying tenets and theories of action, each presses on local education enterprises to organize, manage, and improve instruction in ways that advance quality and equity in students' educational opportunities, experiences, and outcomes. These logics include:

- *Systems thinking* that takes entire schools, districts, and networks as the unit of improvement and that aims for coherent organizational support for classroom instruction.
- *Standards and accountability* aimed at a) raising expectations and building consensus around ambitions for student learning, instructional practice, and leadership practice and b) motivating improvement through incentives and sanctions tied to assessments and evaluations.
- *Markets and choice* in-and-among local education enterprises aimed at stimulating educational entrepreneurship and innovation responsive to the educational values and aspirations of students and families.
- *Data and evidence* aimed both at a) advancing disciplined, data-driven, evidence-informed analysis, planning, and evaluation in local education enterprises and b) incorporating evidence-based/ evidence-proven resources and practices into those efforts.
- *Autonomy and professionalism* aimed at a) preserving local authority over substantive educational matters and b) developing teachers' and leaders' knowledge, capabilities, and values as key levers on advancing educational quality and equity.

Over this forty year span, the sustained press for excellence and equity has played out in-and-through the educational resource market and local public education enterprises described above, in macro-level policy contexts in which fundamental matters of access, quality, and equity continue to be contended, pressed, and adjudicated. Progress is a matter of perspective.

From one angle, this sustained press appears to be motivating a fundamental shift in local education enterprises: beyond functioning as engines of mass public schooling to also functioning as instructionally focused education systems, with leaders and teachers collaborating to organize, manage, and improve instruction to advance quality and equity (Glazer et al., 2020; Peurach, Cohen, Yurkofsky, et al., 2019; Spillane, Peurach, & Cohen, 2019; Spillane, Seelig, et al., 2019). This period has also seen the emergence of new resources to support such work (e.g., culturally responsive pedagogical approaches, standards-aligned curricula, formative assessments, and learning management systems); the emergence of improvement networks as a new organizational form supporting instructional and organizational improvement (Peurach & Glazer, 2012); and new research methods identifying cases of exceptional growth among districts serving large populations of historically marginalized students (Reardon & Hinze-Pifer, 2017).

From another angle, local education enterprises continue to engage these policy dynamics in familiar ways: symbolically, with the aim of maintaining public confidence and legitimacy without engaging deeply in instructional improvement (Peurach, Cohen, Yurkofsky, et al., 2019). Moreover, these policy dynamics have yielded new political dynamics: concern with the emergence of a failing schools narrative associating evidence of persistent underperformance with students, schools, and communities of color;

feelings of disempowerment and harm in these schools and communities and, with that, renewed calls for equal voice and participation in defining and advancing quality and equity (Ishimaru et al., 2019); concern with continuing disparities in educational outcomes (National Assessment of Educational Progress, 2019); and renewed movements seeking to establish students' constitutional right to learn (George, 2021).

The Improvement Movement

Thus, increasing transparency in public education and an increasing macro-level policy focus on excellence and equity interacted to assert a sustained press on local education enterprises to improve instructional practice and its contexts. Concurrently, macro-level policy contexts were evolving to support researchers, educational professionals, and community constituents in collaborating in new ways to produce and use the practical knowledge needed to advance educational quality and equity in locally responsive ways.

This is the production of “useable knowledge” as described by Lindblom and Cohen (1979). This is Pasteur’s Quadrant and “use-inspired basic research” as described by Stokes (1997). This is improvement research as defined at the outset: grounded in practice and community contexts; focused on local educational matters; characterized by disciplined methods of analysis, problem solving, and design; and advanced in inclusive, collaborative organizational forms. As it evolved, the transparency movement began providing evidence that democratizing capabilities of this sort was possible through new types of epistemic communities engaged in collaborative, evolutionary learning. The evolving excellence and equity movement began amplifying the imperative to do exactly that.

Indeed, by the 2010s, early champions of the excellence and equity movement were arguing that realizing its ambitions would require supporting local education enterprises in evolving not only as *education systems* with capabilities to organize, manage, and improve instruction but, also, as *learning systems* with capabilities to engage diverse stakeholders in processes of collaborative, continuous improvement (O’Day & Smith, 2019). Concurrently, intellectual and social justice activists began pressing for a fundamental reconsideration: the rotation of equity *ahead* of excellence, and the pursuit of *equal voice and participation* in defining and advancing quality in public education (Wilson & Horsford, 2013).

While long viewed within the academy and beyond as lacking the rigor and prestige of scientific research, the roots of a movement to democratize disciplined approaches to educational innovation and improvement had been gathering much earlier, with the philosophical pragmatism of the progressive reform movement in the early 1900s and the emergence and embrace of action research mid-century (Adelman, 1993). They accumulated rapidly through the late 1980s and into the 2000s: for example, with new conceptions of professional knowledge and methods of reflective practice (Cochran-Smith & Lytle, 1990; Lampert, 1985; Shulman, 1987); new approaches to practice-based design research (Brown, 1992; Collins, 1992); new designs for organizing schools for practical problem solving (e.g., the Accelerated Schools Project, in 1986); and new consortia and centers partnering with local education enterprises to address problems of practice and policy (e.g., the University of Chicago Consortium on School Research, in 1990; the Strategic Education Research Partnership, in 2003).

Developments in the education sector paralleled (and were buttressed by) the broader evolution of knowledge production across fields, sectors, and societies. This included new conceptualizations of evolutionary learning across disciplines (e.g., Ansell, 2011; March, 1996; Nelson & Winter, 1982; Van de Ven et al. 1999); new, trans-disciplinary traditions of practice-focused use, innovation and improvement (e.g., Berwick, 2013; Brown, 2009; Deming, 1982; Fixsen et al., 2019; Patton, 2010; Sawyer, 2014);

new research on the work, management, and environments of innovation (e.g., Dodgson et al., 2014; Fagerberg et al., 2004; Poole & Ven de Ven, 2004); all amidst the technology-enabled information and knowledge revolution.

The 2010s marked a point at which all of the preceding gathered as a coherent improvement movement in education, with a critical mass of organizations, interests, and individuals coalescing to identify improvement research as a rigorous tradition of knowledge production and use; to advance it as an inclusive, locally empowering approach to improving practice and practice contexts; and to elevate its presence, legitimacy, and influence in academic, professional, community, and policy contexts. Its emergence was marked by:

- Efforts to frame common values, purposes, and methods that define the movement and that establish its legitimacy and relevance (Bryk et al., 2015; O'Day & Smith, 2019; Penuel & Gallagher, 2017; Penuel et al., 2020; Yurkofsky et al., 2020).
- The proliferation of institutional entrepreneurs (e.g., the Strategic Education Research Partnership, the Carnegie Foundation for the Advancement of Teaching, the National Network for Education Research Practice Partnerships, and the National Center on Scaling Up Effective Schools), formal associations (e.g., the Improvement Science Special Interest Group within the American Educational Research Association), and invisible colleges (e.g., LearnDBIR, the Improvement Scholars Network, and the Improvement Leadership Education and Development Network).
- Efforts to draw proponents into tighter association through myriad convenings and through national conferences: for example, conferences hosted by the National Center on Scaling Up Effective Schools (in 2012 and 2014), the annual Carnegie Summit on Improvement in Education (launched in 2014), and the Annual Forum of the National Network for Education Research Practice Partnerships (launched in 2016).
- The emergence of exemplars and leaders among communities, districts, county offices, technical service providers, and states (Bryk, 2020).

The onset of the improvement movement was supported largely by philanthropy, including the *Networks for School Improvement* initiative: a \$500M grant program launched in 2018 by the Bill and Melinda Gates Foundation aimed at catalyzing an ecosystem of networks, technical support partners, equity advocates, and evaluators collaborating to advance educational quality and equity for Black, Latinx, and low-income high school students.

By contrast, the improvement movement emerged absent a federally supported “improvement infrastructure” analogous to the institutionalized, RDDU evidence infrastructure (Penuel et al., 2021; Peurach, 2016; Peurach et al., 2018). Rather, those advancing improvement research did so amidst efforts to strengthen that evidence infrastructure and within existing federal funding streams. That had researchers competing for funding, working on the same timelines, and subject to the same evaluation standards as others seeking to produce evidence-based and evidence-proven resources. It also risked ritualized, ceremonial engagement by local education enterprises aimed at garnering legitimacy, absent earnest efforts to improve instructional practice, organization, and management (Peurach et al., 2018; Yurkofsky, 2020).

Continuing into the 2020s, the state of the improvement movement is, again, a matter of perspective. From one angle, it appears vulnerable to uncertainty far beyond the lack of federal infrastructure and the struggle to establish firm footing on the national policy agenda. The onset of a global pandemic and domestic racial and political conflict have shaken the public education enterprise to its foundation,

with its nearly 400 year policy history alive in the moment. The instant pivot to online learning has driven a fundamental reconsideration of educational access, quality, and equity; demand for more and better educational resources, knowledge of what works, and transparency in educational processes and outcomes; and the transformation of instructional practice, organization, and management. Concurrently, intellectual and social justice activists are seeking to reposition equal voice and participation still higher on the national agenda: an increasingly coherent equity movement unto itself, pressing for *equity-forward innovation and improvement* anchored in moral responsibility and empowerment.

From another angle, the improvement movement appears to be the right movement, positioned at the right place, at the right time. The improvement movement is laying the groundwork for a new, macro-level knowledge infrastructure to complement the institutionalized, federally supported evidence infrastructure: the former supporting the local production and use of practical knowledge; the latter supporting the production and use of scientific knowledge. It is positioned in a similar, Janus-like way: as capping the practice-forward approach to innovation and improvement, buttressed by parallel developments beyond education, and a possible foundation on which to continue building. And it is emerging at a time when overwhelming uncertainty and institutionalized inequality are amplifying the imperative and the press to democratize educational innovation and improvement.

The Originating Structure of the Practice-Forward Approach

By this analysis, the practice-forward approach to educational innovation has emerged and developed over the past 50+ years as a second stratum of US educational reform, as progress toward equal access to *public schooling* brought matters of quality and equity in *public education* into sharper relief.

The practice-forward approach evolved out of the resource-forward approach, with efforts to elevate the role, legitimacy, and rigor of educational research within the federally supported evidence infrastructure fueling the onset of the transparency movement. It functions as a complement to the resource-forward approach: the former supporting the practical work of operationalizing societal ambitions for educational access, quality, and equity; the latter providing a rich toolbox from which to draw; both necessary; neither sufficient. It is evolving in ways paralleling the resource-forward approach, with the emergence of an improvement movement as a new, complementary knowledge infrastructure both capping the practice-forward approach and providing a foundation on which to continue building.

The three sub-strata of the practice-forward approach —the transparency movement, the excellence and equity movement, and the improvement movement— function more as an originating than a deep structure, as they are variably integrated into the function, culture, and political structure of macro-level policy contexts. Indeed, the practice-forward approach is geologically young compared to the resource-forward approach, still developing, and as yet lacking the full mesh of federal policies, administrative structures, and court decisions that brace the resource-forward approach. With that, it appears more open to reformation, vulnerable to resistance, and susceptible to shock.

Reflections

Our geological analysis provides a new perspective on the macro-level policy contexts of improvement research in K-12 US public education: not only as a source of contemporary incoherence, turbulence, and tension but, also, as a source of historical structure, with layers of accumulating policy activity pressing to increase educational access, quality, and equity while delegating responsibility for operationalizing those ambitions to local education enterprises. These layers date to the inception of public education; these layers are alive in the moment.

On the surface sits an improvement movement supporting disciplined approaches to local knowledge production and use. Drilling down, the improvement movement sits atop an excellence and equity movement, itself atop a transparency movement, the three forming an originating structure supporting practice-forward innovation and improvement in local education enterprises. Drilling deeper, the transparency movement dissolves into a federally supported evidence infrastructure, itself atop an educational resource market, itself atop government infrastructure supporting universal access to public schooling, the three forming a deep structure supporting resource-forward innovation and improvement in local education enterprises.

As these layers of policy activity have been developing and accumulating, the capabilities of local education enterprises have been developing and accumulating in kind: initially, as engines of mass public schooling providing increasing access to more (and more diverse) students; then, as instructionally focused education systems in which leaders and teachers collaborate to organize, manage, and improve classroom instruction; and, now, as inclusive learning systems using disciplined approaches to analysis, problem solving, and design to address local educational opportunities, needs, and problems.

Returning to our motivating question, this new perspective on macro-level policy contexts provides new purchase on the currency and novelty of efforts to democratize educational innovation and improvement. By our geological analysis, this currency and novelty lie in the co-evolution of macro-level policy contexts and local education enterprises: the former, beyond *resource-forward* innovation and improvement to *practice-forward* innovation and improvement; and the latter, from *school systems* to *education systems* to *learning systems*.

With that, local education enterprises operating under a centuries-long, macro-level press to increase educational access, quality, and equity are now doing so not only by acquiring more and better educational resources (as has long been the status quo) but, also, by beginning to develop capabilities to use disciplined, inclusive approaches to improving their core educational function — classroom instruction — and the contexts in which it is situated.

This new perspective and new purchase suggest the need for a new discourse in the US about the merits and place of improvement research in education. Contemporary discourse is often skeptical, with the improvement movement subordinated to a hegemonic evidence movement in macro-level policy contexts and judged as sub-standard in an academy that has long privileged scientific over practical knowledge. The counter-discourse is often defensive, aimed at de-legitimizing and arguing away the status quo to claim its place.

By contrast, our analysis suggests the need for a shared discourse that considers efforts to democratize disciplined approaches to educational innovation and improvement as potentially integral to the continuing evolution of US public education in pursuit of its most fundamental ambitions, within its bedrock architecture, at a moment of urgency and opportunity.

This new perspective and new purchase also suggest new possibilities to shift policy discourse beyond the US

This new perspective on macro-level policy contexts provides new purchase on the currency and novelty of efforts to democratize educational innovation and improvement. By our geological analysis, this currency and novelty lie in the co-evolution of macro-level policy contexts and local education enterprises: the former, beyond resource-forward innovation and improvement to practice-forward innovation and improvement; and the latter, from school systems to education systems to learning systems.

by examining parallel developments in other countries. The expansion of macro-level policy agendas beyond equal access to public schooling to quality and equity in public education is not unique to the US; nor are efforts to advance the use of research evidence and the development of new types of learning systems; nor is the tension between the institutionalized RDDU logic and the information and knowledge revolution. Less clear are the histories that explain the emergence and currency of these national policy agendas; the matters these agendas aim to address or redress; their sources of support and opposition; their progress and complications; all crossed by different macro/meso/micro architectures.

That suggests advantage in additional geological analyses, by drilling down into different national education enterprises in search of some sort of bedrock; extracting and comparing core samples; discerning fundamental ambitions (with particular attention to access, quality, and equity); examining the drivers, development, and accumulation of policy strata and sub-strata over time (with particular attention to resources, practice, and power); and discerning movements and infrastructures supporting the production and use of scientific, practical, and other domains of knowledge.

Comparative analyses of this sort would create opportunity to interrogate dynamics central to our analysis: for example, the simultaneous accumulation-and-evolution of policy activity over time; the role of the federal government in this slow, steady, but quickening “upward build”; and the different and complementary purposes served by different modes of knowledge production. They would also create opportunity to examine essential matters that warrant deeper investigation (e.g., the role of the education professions in national education enterprises, and processes of societal transformation as interwoven with systems of power and oppression); to explore new possibilities (e.g., equity-forward educational innovation and improvement as developing in other national contexts); and to experiment with alternative metaphors (e.g., metaphors that foreground “interwoven-ness” vs. “layered-ness”).

Pursuing such an agenda would serve political purposes by evidencing the currency of efforts to democratize educational innovation and improvement in the global context. It would serve academic purposes by leveraging cross-national variation to develop more general theories of the emergence, advancement, and challenges of democratizing educational innovation and improvement. It would serve practical purposes by empowering those seeking to democratize educational innovation and improvement with new legitimacy and knowledge on which to draw in supporting local education enterprises. The evolution of local education enterprises, in turn, would renew the need and opportunity for cross-national research.

Pursuing such an agenda would be a long-term, intellectually demanding undertaking. At least in the US, it could also be contentious, as it would maintain a political, academic, and practical focus on building national education systems at a time when some critics on both the right and the left are working to dismantle them, each for their own reasons. In that sense, pursuing such an agenda would be hopeful in the same way that our analysis is hopeful: It would seek to identify positive ways that macro-level policy contexts have worked, are working, and might work to support local education enterprises in evolving from school systems to education systems to learning systems, in the US and around the world.⁶

References

- Adelman, C. (1993). Kurt Lewin and the origins of action research. *Educational Action Research*, 1 (1), 7-24
- Alexander, L. (1987). *The nation's report card*. Washington, DC: National Academy of Education.
- Anderson, J. D. (1988). *The education of Blacks in the South, 1860-1935*. Chapel Hill, NC: The University of North Carolina Press.
- Ansell, C. K. (2011). *Pragmatist democracy: Evolutionary learning as public philosophy*. New York, NY: Oxford University Press.
- Berman, P. & McLaughlin, M. W. (1975). *Federal programs supporting educational change (Vol. 4): The findings in review*. Santa Monica, CA: Rand.
- Berends, M., Bodilly, S. J., & Kirby, S. N. (2002). *Facing the challenges of whole school reform: New American Schools after a decade*. Santa Monica, CA: Rand.
- Berwick, D. M. (2013). *Promising care: How we can rescue health care by improving it*. San Francisco, CA: Jossey-Bass.
- Borman, G. & Dowling, M. (2010). Schools and inequality: A multilevel analysis of Coleman's equality of educational opportunity data. *Teachers College Record*, 112 (5), 1201-1246.
- Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *The Journal of the Learning Sciences*, 2 (2), 141-178
- Brown, T. (2009). *Change by design: How design thinking transforms organization and inspires innovation*. New York, NY: Harper Business.
- Bryk, A. S. (2009). Support a science of performance improvement. *Phi Delta Kappan*, 90 (8), 597-600.
- Bryk, A. S. (2020). *Improvement in action: Advancing quality in America's schools*. Cambridge, MA: Harvard Education Press.
- Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to improve: How America's schools can get better at getting better*. Cambridge, MA: Harvard University Press.
- Bryk, A. S., & Raudenbush, S. W. (1988). Toward a more appropriate conceptualization of research on school effects: A three-level hierarchical linear model. *American Journal of Education*, 97 (1), 65-108.
- Bush, V. (1945). *Science: The endless frontier*. Retrieved February 01, 2021, from https://www.nsf.gov/about/history/EndlessFrontier_w.pdf
- Campano, G., Ghiso, M. P., & Thakurta, A. (forthcoming). Community-based partnerships: Fostering epistemic rights through improvement-focused research. In D. J. Peurach, J. L. Russell, L. Cohen-Vogel, and W. R. Penuel (Eds.), *The Foundational Handbook on Improvement Research in Education*. Lanham, MD: Rowman and Littlefield.
- Carnegie Forum on Education and the Economy Nation. (1986). *A nation prepared: Teachers for the 21st century*. New York, NY: Carnegie Corporation.
- Cauthen, L. (2021). *Tech spending predictions for America's schools in 2021*. Retrieved April 01, 2021, from <https://thelearningcounsel.com/article/tech-spending-predictions-america's-schools-2021-amid-enrollment->

losses.

Chubb, J. E. & Moe, T. M. (1988). Politics, markets, and the organization of schools. *The American Political Science Review*, 82 (4), 1065-1087.

Cobb, P. & Wilhelm, A. G. (forthcoming). Classroom teaching and learning as the focus of improvement research. In D. J. Peurach, J. L. Russell, L. Cohen-Vogel, and W. R. Penuel (Eds.), *The Foundational Handbook on Improvement Research in Education*. Lanham, MD: Rowman and Littlefield.

Coburn, C. E. (2003). Rethinking scale: Moving beyond numbers to deep and lasting change. *Educational Researcher*, 32 (6), 3-12.

Cochran-Smith, M. & Lytle, S. L. (1990). Research on teaching and teacher research: The issues that divide. *Educational Research*, 19 (2), 2-11.

Cohen, D. K. (1990). A revolution in one classroom: The case of Mrs. Oublier. *Educational Evaluation and Policy Analysis*, 12 (3), 311-329.

Cohen, D. K. & Mehta, J. D. (2017). Why reform sometimes succeeds: Understanding the conditions that produce reforms that last. *American Educational Research Journal*, 54 (4), 644-690.

Cohen, D. K., Peurach, D. J., Glazer, J. L., Gates, K., & Goldin, S. (2014). *Improvement by design: The promise of better schools*. Chicago, IL: University of Chicago Press.

Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2003). Resources, instruction, and research. *Educational Evaluation and Policy Analysis*, 25 (2), 119-142.

Cohen, D. K., & Spillane, J. P. (1992). Policy and practice: The relations between governance and instruction. *Review of Research in Education*, 18 (1), 3-49.

Cohen, D. K., Spillane, J. P., & Peurach, D. J. (2018). The dilemmas of educational reform. *Educational Researcher*, 47 (3), 204-212.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., & Others. (1966). *Equality of educational opportunity*. Washington, D.C.: National Center for Educational Statistics.

Collins, A. (1992). Towards a design science of education. In E. Scanlon & T. O'Shea (Eds.), *New directions in educational technology* (pp. 15-22). Berlin: Springer.

Cremin, L. A. (1970). *American education: The colonial experience, 1607-1783*. New York, NY: Harper & Row.

Cubberley, E. P. (1919). *Public education in the United States: A Study and interpretation of American educational history*. United States: Houghton Mifflin.

Datnow, A., & Park, V. (2009). Towards the co-construction of educational policy: Large-scale reform in an era of complexity. In D. Plank, B. Schneider, & G. Sykes (Eds.), *Handbook of Education Policy Research* (pp. 348-361). New York, NY: Routledge Publishers.

Deming, W. E. (1982). *Quality, productivity, and competitive position*. Cambridge, MA: MIT Press.

Dodgson, M., Gann, D. M., & Phillips, N. (Eds.) (2014). *The Oxford handbook of innovation management* (1st edition). New York, NY: Oxford University Press.

Duncan, G. J. & Murnane, R. J. (2014). *Restoring opportunity: The crisis of inequality and the challenge for*

American education. Cambridge, MA: Harvard Education Press.

Elson, R. Miller. (1964). *Guardians of tradition: American schoolbooks of the nineteenth century*. Lincoln: University of Nebraska Press.

Fagerberg, J., Mowery, D. C., & Nelson, R. R. (Eds.) (2004). *The Oxford handbook of innovation* (1st edition). New York, NY: Oxford University Press.

Fixsen, D. L, Blase, K A., & Van Dyke, M. K. (2019). *Implementation practice and science*. Chapel Hill, NC: Active Implementation Research Network.

Flesch, R. (1955). *Why Johnny can't read (and what you can do about it)*. New York, NY: Harper & Brothers.

Fuhrman, S. H. (1993). *Designing coherent education policy*. San Francisco, CA: Jossey-Bass.

George, J. (2021). *A lesson on critical race theory*. Retrieve April 01, 2021, from https://www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/civil-rights-reimagining-policing/a-lesson-on-critical-race-theory/

Ginsburg, A. L., Noell, J., & Plisko, V. W. (1988). Lessons from the wall chart. *Educational Evaluation and Policy Analysis*, 10 (1), 1-12.

Glazer, J. L., Greany, T., Duff, M., & Berry, W. (forthcoming). Networked improvement in the US and England: A new role for the middle tier. In D. J. Peurach, J. L. Russell, L. Cohen-Vogel, and W. R. Penuel (Eds.), *The Foundational Handbook on Improvement Research in Education*. Lanham, MD: Rowman and Littlefield.

Glazer, J. L., Massell, D., Lenhoff, S. W., Larbi-Cherif, A., Egan, C., Taylor, J. E., Ison, A., Deleveaux, J., & Millington, Z. (2020). *District-led school turnaround: Aiming for ambitious and equitable instruction in Shelby County's iZone*. Retrieved February 1, 2021, from https://repository.upenn.edu/cpre_researchreports/114

Glazer, J. L. & Peurach, D. P. (2015). *Occupational control in education: The logic and leverage of epistemic communities*. *Harvard Educational Review*, 85 (2), 172-202.

Glennan, T. K., Jr., Bodilly, S. J., Galegher, J. R., and Kerr, K. A. (2004). Summary: Toward a more systematic approach to expanding the reach of educational interventions. In T. K. Glennan, Jr., S. J. Bodilly, J. R. Galegher, and K. A. Kerr (Eds.), *Expanding the Reach of Educational Reforms: Perspectives from Leaders in the Scale-Up of Educational Interventions* (pp. 647-685). Santa Monica, CA: Rand.

Godin, B. (2006). The linear model of innovation: The historical construction of an analytic framework. *Science, Technology, and Human Values*, 31 (6), 639-667.

Greenwald, R., Hedges, L. V., & Laine, R. D. (1996). The effect of school resources on student achievement. *Review of Educational Research*, 66 (3), 361-396.

Haskins, R. & Baron, J. (2011). Part 6: The Obama Administration's evidence-based social policy initiatives: An overview. In R. Puttick (Ed.), *Evidence for social policy and practice: Perspectives on how research and evidence can influence decision making in public services*. London, UK: Nesta.

Hanushek, E. A. (1989). The impact of differential expenditures on school performance. *Educational Researcher*, 18 (4), 45-62.

Ishimaru, A.M., Bang, M., Valladares, M.R., Nolan, C.M., Tavares, H., Rajendran, A., & Chang, K. (2019). *Recasting families and communities as co-designers of education in tumultuous times*. Boulder, CO: National

Education Policy Center. Retrieved February 01, 2021, from <http://nepc.colorado.edu/publication/family-leadership>.

Jabbar, H. & Childs, J. (forthcoming). Critical perspectives on the contexts of improvement research in education. In D. J. Peurach, J. L. Russell, L. Cohen-Vogel, and W. R. Penuel (Eds.), *The Foundational Handbook on Improvement Research in Education*. Lanham, MD: Rowman and Littlefield.

Jencks, C., Smith, M., Acland, H., Bane, M.J., Cohen, D., Gintis, H., Heyns, B., & Michelson, S. (1972). *Inequality: A reassessment of the effect of family and schooling in America*. New York, NY: Basic Books.

Johnson, C. (1904). *Old-time schools and school-books*. United Kingdom: Macmillan.

Kaestle, C. F. (1983). *Pillars of the republic: Common schools and American society, 1780-1860*. New York, NY: Hill and Wang.

Kaestle, C. F. (1993). The awful reputation of educational research. *Educational Researcher*, 22 (1), 23, 26-31.

Lampert, M. (1985). How do teachers manage to teach? Perspectives on problems in practice. *Harvard Educational Review*, 55 (2), 178-194.

Lindblom, C. E. & Cohen, D. K. (1979). *Useable knowledge: Social science and social problem solving*. New Haven, CT: Yale University Press.

Lortie, D. C. (1975). *Schoolteacher: A sociological study*. Chicago, IL: The University of Chicago Press.

March, J. G. (1996). Exploration and exploitation in organizational learning. In M. D. Cohen & L. S. Sproull (Eds.), *Organizational learning* (pp. 101-123). Thousand Oaks, CA: Sage Publications. (Reprinted from *Organization Science*, 2 (1), February 1991).

Meyer, J. W. & Rowan, B. (1978). *The structure of educational organizations*. In Meyer, M. W. (Ed.). *Schools and society: A sociological approach to education* (pp. 217-225). San Francisco: Jossey-Bass.

Morgan, K. L. (2021). *The constitution and federal jurisdiction in American education*. Retrieved February 01, 2021, from <https://lonang.com/commentaries/foundation/federal-jurisdiction-in-education/>

Moss, H. J. (2009). *Schooling citizens: The struggle for African American education in Antebellum America*. Chicago, IL: University of Chicago Press.

National Assessment of Educational Progress. (2019). *Results from 2019 mathematics and reading assessments*. Retrieved February 01, 2021, from https://www.nationsreportcard.gov/mathematics/supportive_files/2019_infographic.pdf

National Commission on Educational Excellence (1983). *A nation at risk: The imperative for educational reform*. Washington, D.C.: U.S. Government Printing Office.

National Governors Association. (1986). *Time for Results: The Governors' 1991 Report on Education*. Washington, D.C.: National Governors Association.

Nelson, R. R. & Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.

O'Day, J. A. & Smith, M. S. (2019). *Opportunity for all: A framework for quality and equality in education*. Cambridge, MA: Harvard Education Press.

Patton, M. Q. (2011). *Developmental evaluation: Applying concepts to enhance innovation and use*. New York, NY: Guilford Press.

Penuel, W. R., Furtak, E. M., & Farrell, C. C. (2021). *Research-practice partnerships in education: Advancing an evolutionary logic of systems improvement*. *Die Deutsche Schule*, 113(1), 45-62. <https://doi.org/10.31244/dds.2021.01.05>

Penuel, W. R. & Gallagher, D. J. (2017). *Creating research-practice partnerships in education*. Cambridge, MA: Harvard Education Press.

Penuel, W. R., Riedy, R., Barber, M. S., Peurach, D. J., LeBouef, W.A., & Clark, T. (2020). Principles of collaborative education research with stakeholders: Toward requirements for a new research and development infrastructure. *Review of Educational Research*, 90 (5), 627-674.

Peurach, D. J. (2011). *Seeing complexity in public education: Problems, possibilities, and Success for All*. New York, NY: Oxford University Press.

Peurach, D. J. (2015a). *Educational innovation and problems of improvement: Aligning politics, policies, and practice*. Retrieved on February 01, 2021, from <https://my.vanderbilt.edu/scalingupcenter/files/2016/12/The-Practice-of-Innovation-and-Problems-of-Improvement.pdf>.

Peurach, D. J. (2015b). *Intelligently partnering for Common Core implementation*. In J. A. Supovitz and J. P. Spillane (Eds.). *Challenging standards: Navigating conflict and building capacity in the era of the Common Core* (pp. 113-122). Lanham, MD: Rowman & Littlefield.

Peurach, D. J. (2016). Innovating at the nexus of impact and improvement: Leading educational improvement networks. *Educational Researcher*, 45 (7), 421-429.

Peurach, D. J., Cohen, D. K., & Spillane, J. P. (2019). Governments, markets, and instruction: Considerations for cross-national research. *Journal of Educational Administration*. DOI 10.1108/JEA-09-2018-0172

Peurach, D. J., Cohen, D. K., Yurkofsky, M., & Spillane, J. P. (2019). From mass schooling to educational systems: Changing patterns in the organization and management of instruction. *Review of Research in Education*, 43, 32-67.

Peurach, D. J. & Foster, A. T. (2020). The policy contexts of United States educational innovation and improvement. In A. Hynds (Ed.), *Oxford Bibliographies in Education*. New York, NY: *Oxford University Press*.

Peurach, D. J. & Glazer, J. L. (2012). Reconsidering replication: New perspectives on large-scale school improvement. *Journal of Educational Change*, 13 (2), 155-190.

Peurach, D. J., Glazer, J. L., & Lenhoff, S. W. (2016). The developmental evaluation of school improvement networks. *Educational Policy*, 30 (4), 606-648.

Peurach, D. J., Penuel, W. R., and Russell, J. L. (2018). Beyond ritualized rationality: Organizational dynamics of instructionally focused continuous improvement. In C. James, D. E. Spicer, M. Connolly, & S. D. Kruse (Eds.), *The Sage Handbook of School Organization*. Thousand Oaks, CA: Sage.

Peurach, D. J., Russell, J. L., Cohen-Vogel, L., Penuel, W. R. (forthcoming). *The foundational handbook on improvement research in education*. Lanham, MD: Rowman and Littlefield.

Peurach, D. J., Yurkofsky, M. M., Sutherland, D. H., Blaushild, N., & Spillane, J. S. (2020). Analyzing instructionally focused education systems: Exploring the coordinated use of complementary frameworks.

Peabody Journal of Education, 95 (4), 336-355.

Poole, M. S. & Ven de Ven, A. H. (Eds.) (2004). *Handbook of organizational change and innovation (1st edition)*. New York, NY: Oxford University Press.

Ravitch, D. (1990). Education in the 1980's: A concern for "quality". Retrieved February 01, 2021, from <https://www.edweek.org/policy-politics/opinion-education-in-the-1980s-a-concern-for-quality/1990/01>

Reardon, S. F. (2016). The Coleman Report and educational inequality 50 years later. *The Russell Sage Foundation Journal of the Social Sciences*, 2 (5), 34-57.

Reardon, S.F., & Hinze-Pifer, R. (2017). Test score growth among public school students in Chicago, 2009-2014. Retrieved February 21, 2021, from <https://cepa.stanford.edu/content/test-score-growth-among-chicago-public-school-students-2009-2014>.

Reed, D. S. (2003). *On equal terms: The constitutional politics of educational opportunity*. Princeton, NJ: Princeton University Press.

Rogers, E. M. (2003). *Diffusion of innovations (5th edition)*. New York: The Free Press.

Rowan, B. (2002). The ecology of school improvement: Notes on the school improvement industry in the United States. *Journal of Educational Change*, 3, 283-314.

Rowan, B., Correnti, R. J., Miller, R. J., & Camburn, E. M. (2009). School improvement by design: Lessons from a study of comprehensive school reform programs. In G. Sykes, B. Schneider, & D. Plank (eds.) *AERA Handbook on Education Policy Research* (pp. 637-651). New York: Routledge.

Sawyer, R. K. (Ed.) (2014). *The Cambridge handbook of the learning sciences (2nd edition)*. New York, NY: Cambridge University Press.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Education Review*, 57 (1), 1-22.

Simba Information. (2021). *Publishing for the preK-12 market 2020-2021*. Retrieved February 01, 2021, from <https://www.simbainformation.com/Publishing-PreK-13535994/>

Slavin, R. E. (1999). The pendulum revisited: Faddism in education and its alternatives. In G. J. Cizek (Ed.), *Handbook of educational policy* (pp. 373-386). Burlington, MA: Academic Press.

Smith, M. S., & O'Day, J. A. (1990). Systemic school reform. *Journal of Education Policy*, 5 (5), 223-267.

Spillane, J. P., Peurach, D. J., & Cohen, D. K. (2019). Comparatively studying educational system (re)building cross-nationally: A new agenda for cross-national educational research. *Educational Policy*, 33 (6), 916-945.

Spillane, J. P., Seelig, J. L., Blaushild, N. L., Cohen, D. K., & Peurach, D. J. (2019). Education system building in a changing educational sector: Environment, organization, and the technical core. *Educational Policy*, 33 (6), 846-881.

Stokes, D. E. (1997). *Pasteur's quadrant: Basic science and technological innovation*. Washington, D.C.: Brookings.

Thümler, E. (2014). Islands of success revisited: Which role for philanthropy? In E. Thümler, N. Boügelein, A. Beller, & H. K. Anheier (Eds.). *Philanthropy and education: Strategies for impact* (pp. 236-245). Basingstoke: Palgrave Macmillan.

Tyack, D. & Cuban, L. (1997). *Tinkering toward Utopia: A century of public school reform*. Cambridge, CA: Harvard University Press.

Tyack, D. & Hansot, E. (1982). *Managers of virtue: Public school leadership in America, 1820-1980*. New York, NY: Basic Books, Inc.

Tyack, D. & Tobin, W. (1994). The “grammar” of schooling: Why has it been so hard to change? *American Educational Research Journal*, 31 (3), 453-479.

Van de Ven. A. H., Polley, D. E., Garud, R., & Venkataraman, S. (1999). *The innovation journey*. Oxford: Oxford University Press.

Wilson, C. M. & Horsford, S. D. (2013). *Advancing equity and achievement in America’s diverse schools: Inclusive theories, policies, and practices*. New York, NY: Routledge.

Vinovskis, M. A. (1999). *The road to Charlottesville: The 1989 Education Summit*. Washington, D.C.: National Education Goals Panel.

Yurkofsky, M. W. (2020). Technical ceremonies: Rationalization, opacity, and the restructuring of educational organizations. *Harvard Educational Review*, 90 (3), 446-473.

Yurkofsky, M. W., Peterson, A. J., Mehta, J. D., Horwitz-Willis, R., & Frumin, K. M. (2020). Research on continuous improvement: Exploring the complexities of managing educational change. *Review of Research in Education*, 44, 403-433.

Endnotes

1. This essay is a working paper for inclusion in *The Foundational Handbook on Improvement Research in Education* (Peurach et al., forthcoming), in coordination with a series of chapters reviewing and critically analyzing research on the micro-, meso-, and macro-level contexts of improvement research in education: Cobb and Wilhelm (forthcoming); Glazer et al. (forthcoming); Campano et al. (forthcoming); and Jabbar and Childs (forthcoming). Work on this essay was supported by the Carnegie Foundation for the Advancement of Teaching and the Study of Systems Design for Ambitious Elementary Science Instruction at Northwestern University and University of Michigan, under a grant from the National Science Foundation, Directorate for Education and Human Resources, Core Research program (1761129). The authors gratefully acknowledge colleagues who shared comments on earlier drafts, especially William Berry, Angel Xiao Bohannon, Amanda Datnow, Megan Duff, Joshua Glazer, Toby Greany, Whitney Hegseth, Elizabeth Jones, Christine Neumerski, Jonathan Supovitz, Ekkehard Thümler, and Maxwell Yurkofsky. All opinions and conclusions expressed in this essay are those of the authors and do not necessarily reflect the views of any funding agency.
2. A note to readers: As a chapter in the foundational handbook of a developing field of research, we aimed to contribute a comprehensive “mapping of the terrain”: a thorough indexing of the US education policy space that pulls forward policies, court decisions, initiatives, and movements that serve as useful general knowledge. Owing to word limits, we elaborate some, and we simply reference others. We encourage scholars new to the study of US education policy to engage as active readers by leveraging their favorite search engine to learn more about specific policies, court decisions, initiatives, and movements that spark curiosity. The return, we hope, will be both deeper understanding of US education policy and critical perspective on our analysis.
3. For our earlier analyses of the policy contexts of improvement research in education, see: Peurach and Glazer (2012); Glazer and Peurach (2013); Peurach (2015a); Peurach (2016); Peurach et al. (2016); Peurach et al. (2018); Peurach & Foster (2020); and (Penuel et al., 2020).
4. These strata and sub-strata derive from our prior research on the macro-level policy contexts of improvement research in education (as cited above) and on parallel research on the evolution of districts, networks, and schools both as education systems and as learning systems: Cohen et al. (2014); Cohen et al. (2018); Peurach (2011); Peurach (2015b); Peurach, Cohen, Yurkofsky, et al. (2019); Peurach, Yurkofsky, et al. (2020); and Spillane et al. (2019). That research, in turn, supported initial efforts to frame an agenda for cross-national research (Peurach, Cohen, & Spillane, 2019; Spillane, Peurach, & Cohen, 2019).
5. In earlier work, we framed the federally supported evidence structure as “impact infrastructure”, owing to the policy focus in the 2010s on examining the impact of educational resources and programs on educational outcomes (Peurach, 2016; Peurach et al., 2018).
6. A note from the lead author: Our work writing this essay was bookended with sadness: the passing of David K. Cohen on September 23, 2020, and the passing of Robert E. Slavin,

on April 24, 2021. We were in the thick of our initial draft when David died, and we were completing our final revisions when Bob died. David was my dear mentor, colleague, and friend for 26 years. I worked with Bob nearly as long, beginning with a study of Success for All that launched in the late-1990s. My work with David and Bob animates this essay. With David, I learned about the practice, organization, and management of instruction; about resources, knowledge, and their production and use; about the design and dynamics of policy environments; and about interactions among all the preceding. With Bob, I learned about the complex learning systems that sit behind evidence-based, evidence-proven programs. I also learned a great deal about resilience. This essay is our humble tribute to David and Bob. May their work live in us and continue through us.